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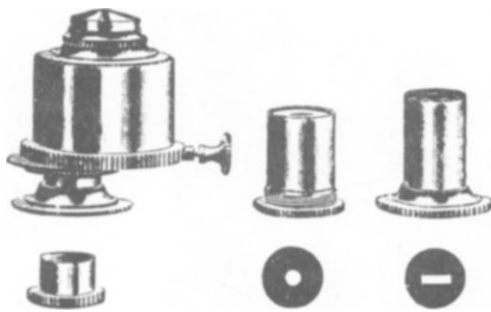
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THE IRIS ILLUMINATOR.

By R. H. WARD, M. D., F. R. M. S., Troy, N. Y.

One who has employed the various forms of graduating diaphragm, from the clumsy but efficient instrument introduced under that namesome twenty years ago to the neat and inexpensive iris diaphragms now furnished by various makers, can scarcely fail to appreciate the luxury of being thus able to regulate with precision the amount of light employed and the breadth of the illuminating pencil, without abrupt change and while the object is under uninterrupted observation. Heretofore, however, this expedient seems to have been applied only to axial illumination. For the sake of attaining similar advantages with oblique illumination, the writer has devised and used a combination believed to be new, which for want of a more correct name he calls the "Iris Illuminator." It consists,



as shown in the figure, of any desired lens system, either dry or immersion, under and close to which is mounted an iris diaphragm with a decentering adjustment; the diaphragm being set in a sliding plate pushed

by a screw or lever, so that it can be moved into any position from the center to the periphery of the system without altering the position of the latter. Thus, not only the obliquity of the light, but the exact amount desired or found advantageous at any chosen obliquity,

can be regulated with perfect precision by a touch of the hand to the screw and to the adjusting collar of the diaphragm.

A blue glass disk for correcting the glare and color of gas or lamp light is fitted to the bottom of the dark well of the diaphragm. A special adapter is also provided for the use, in place of the iris, of central stops for securing dark field illumination; or of a horizontal slit or pair of horizontally arranged apertures, for the better illuminating of binocular microscopes, as proposed by the writer in the *American Naturalist* for December, 1870; or of any special stops desired by the user; or of a polarizing prism and selenite plate. The whole apparatus rotates about its own optical axis, which remains coincident with that of the microscope itself.

This appliance is well adapted to any lens system of moderate size. It is used, perhaps, to the best advantage with a $\frac{1}{4}\sigma$ achromatic condenser, or with the thick, non-achromatic immersion lenses adopted by and named after Prof. Abbe of Jena; the latter being, apparently, preferable to the best achromatic combination for illuminating purposes. It cannot, without outgrowing the limits of the standard $1\frac{1}{2}$ inch sub-stage ring, be applied to the largest lenses now used as condensers, and for this reason, if for no other, it might be unavailable for extreme resolution with objectives of excessive aperture; for which purpose, however, many workers prefer to use light unaltered by passing through any condenser whatever.

By removing the lenses from the top of the apparatus, the iris diaphragm, with or without its blue glass disk or the polarizing prism, will be found in position for use by itself. Except for very low powers, however, or for extreme resolving work on lined objects, the illuminator may be considered a part of the stand and kept habitually in place, the changes of light required for a great variety of work being more rapidly and perfectly accomplished by its aid than without. It is made by the Bausch & Lomb Optical Company, of Rochester, and can be applied to almost any microscope, whether with or without a sub-stage.